The restructuring of schooling with digital technologies and implications for policy makers and practitioners

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Abstract

Traditional forms of schooling remain resistant to change because of the fit with their current ecologies. However, new forms of schooling that depend on communication technologies have emerged, including virtual schools and classes networked across collaborating schools (Davis, Eickelmann & Zaka, 2013). The purpose of this research had been to identify how technologies have resulted in the restructuring of many schools and what implications this has for teachers, local and national policy makers.

Questions to be discussed in the round table session concerning the restructuring of schooling with digital technologies

As to new forms of schooling, two essential questions are addressed and might serve as the shared base for the discussion:

> **Question 1: To what extent and how does recent developments of education and digital technologies challenge and change systems of schooling?**
>
> **Question 2: How can research inform us about the potential of new forms of schooling with digital technologies?**

Question 1 focuses the bottom up process of developing new forms of schooling through changing pedagogical practice (e.g. by teachers, schools and school districts) and/or by policy makers and service providers.
Question 2 brings together the shared knowledge of communities of experts to identify and critique what is known about developing, implementing and sustaining new forms of schooling. On the one hand this comprises knowledge and meta-knowledge about applying different or new technologies into schools, including student owned devices whose use is supported during and after school and educational processed in networked and virtual environments.

In order to analyze these issues we suggest approaching this on different levels. Different perspectives on new systems of schooling in the digital age may be related to: (a) institutions, (b) actors, (c) practices.

Theoretical Framework

(1) Co-evolution of pedagogy and technology

Regardless the claim for answering both questions independently, Davis, Eickelmann and Zaka (2013) indicate the relevance of considering the co-evolution of pedagogy and technology. In this context the co-evolution is defined by the interaction between the evolution of education and the evolution of digital technologies applied within education; both education and digital technologies are evolving and so changes in one tend to stimulate changes in the other. For example, a new software application that is adopted by teachers and their schools will stimulate changes of pedagogical practice under influence of bureaucratic procedures (e.g. school governance), professional development, and commercial aspects. Figure 1 provides a view of the ecologies within which a class is typically nested, conceptualized as an arena with the teacher and her class at the centre.

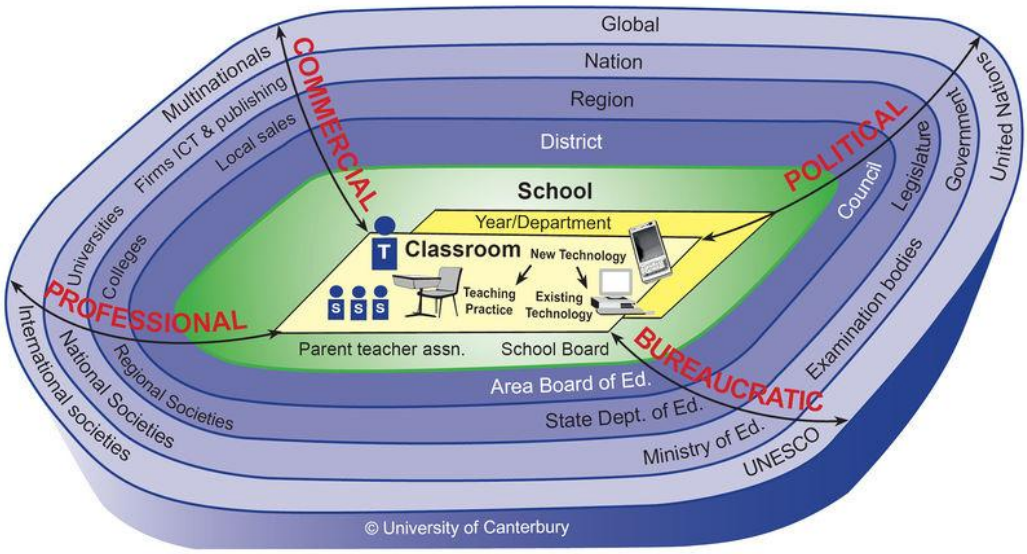

Figure 1 Davi's arena of ecologies considering the co-evolution of pedagogy and technology

(2) Research issues

Research into the implementation of new forms of schooling is rare. Knowledge about transforming organizations, such as the theory of the diffusion of innovations (Rogers 2003), might be helpful. Eickelmann's (2011) longitudinal research of innovative schools in Germany and research by Schrum and Levin (2009) with case studies of the leadership of 21st century schools across the USA, found that not all schools are effective and successful over time. These and other studies are beginning to provide cautions and guidance on ways to implement and sustain strategies for 21st century competencies and occasionally identify some relationship to various education systems.

(3) New ways of learning including informal and online learning

There is also a need to move beyond traditional conceptions of formal vs informal learning, online vs offline activities and try to develop new conceptions of what defines learning spaces across different locations and contexts (Erstad & Sefton-Green 2013; Fullan 2012). How we conceptually should understand this is still unclear, including inequity.

Restructuring of schooling with digital technologies all over the world

Latest developments which can be analyzed on this basis can be found in school systems all over the world:

- **Laptop program** in Norway in secondary schools and Learning Networks' program in Norway. The Learning Network program was initiated to develop new models for schools using networking as an approach. Each network consists of 10-11 schools on different levels working together over time to build sustainable development and strategies for change (Erstad, 2013).
- **Flipped classrooms** in the USA to re-think schooling and meet individualized learning using learning videos and group course learning in huge classrooms, teachers supporting individuals and groups rather than organizing lessons (Sams & Bergmann, 2012).
- **BYOD (bring your own device)**, which is a policy of permitting students and learners to bring personally owned mobile devices (laptops, tablets, and smart phones) to schools where their use is encouraged.
- **Khan Academy**, with its extensive video library, interactive challenges, and assessments from any computer with access to the web using learning videos in different subjects.
- **Distance learning and networked e-learning classes across schools** in New Zealand and elsewhere, sometimes called virtual schooling (Davis, 2012; Davis & Eickelmann, 2013).
- **OER: Open Educational Resources** as freely accessible, usually openly licensed documents and media that are useful for teaching, learning, educational assessment and research purposes. Examples can be found all over the world, such as the OER Africa program, an initiative established by the South African Institute for Distance Education playing a leading role in driving the development and use of OER across all education sectors on the African continent, Wikiwijs (the Netherlands), a program intended to promote the use of OER in the Dutch education sector. In 2012 the OERu was formed to take OER a step further by adding an open approach to assessment as well as curriculum design. OERu research is also openly available on its website (see Ossiannilsson & Creelman, 2012; http://wikieducator.org/OERu).
- **MOOC** (massive open online course) provide online courses aimed at large-scale open access via the web, of which some have interactive participation. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs may provide interactive user forums that help to build a community for teachers and learners plus assessment, such as exams and quizzes. MOOCs are a recent development in distance education that are appropriate for some high school students, particularly those who are talented and gifted who beneft from additional stimulation.
- **Alternative schools**, such Big Picture learning schools (http://www.bigpicture.org/schools/) or the franchising of for profit approaches that develop innovative buildings and cyber infrastructure for the blending of online learning, such as the Carpe Diem franchise (see http://www.carpediemschools.com/).

Implications for policy makers and practitioners

There have been repeated calls for restructuring of schooling to take advantage of information and communication technologies. Digital technologies require ongoing resources and maintenance to continue to work and to evolve alongside changing educational systems. However, co-evolution is often not considered and so organizations may both evolve and reverse that evolution reducing effective deployment of digital technologies when resources and expertise fade. This includes the commitment and expertise of educational leaders.

The following implications had been identified at the EduSummIT 2013 (cf. Eickelmann & Erstad, 2013):

I. Recommendations for policy-makers

a) Acknowledge of the co-evolution of ICT and pedagogies, instead of just equipping schools without giving space and incentives to develop education.
b) Make education more flexible and use ICT-assisted learning concepts to support this (thereby contributing to make education and schooling more successful, also in terms of decreasing drop-out rates, increasing motivation etc).
c) Keep yourself informed about new systems of schooling and recent approaches such as 21st century skills, lifelong learning, integration of formal and informal learning as well as personalized learning and student-centered learning.

II. Recommendation for practitioners

a) Develop and co-construct pedagogical knowledge about new forms of schooling and new forms of teaching in this new environments.
b) Exchange knowledge *within* and *between* schools (e.g., in school networks).
c) Move away from content-orientation to student-centeredness.
d) Make education more flexible with ICT, and thereby more successful.
e) Connect practice with research in order to develop concepts and strategies to learn from research findings.
f) Connect practice with research and develop concepts to learn from research findings.
g) Integrate informal and non-formal learning and by this take over the learners' perspective.
h) School heads should leave room to experiment with new pedagogical approaches and back new developments up.
i) Involve parents, administrations, and other key stakeholders from the beginning and during the process of implementing new systems of schooling in your school.

Brief bibliography and further reading

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